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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/469,162	12/21/1999	MINORU MIYATAKE	Q57339	4626

7590 08/05/2003

SUGHRUE MION ZINN MACPEAK & SEAS PLLC
2100 PENNSYLVANIA AVE NW
WASHINGTON, DC 20037

EXAMINER

CHUNG, DAVID Y

ART UNIT	PAPER NUMBER
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2871

DATE MAILED: 08/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Applicati n N .

09/469,162

Examiner

David Y. Chung

Applicant(s)

MIYATAKE ET AL.

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-- The MAILING DATE of this c mmunication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 May 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 February 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-10 rejected under 35 U.S.C. 103(a) as being unpatentable over Larson (U.S. 6,310,671) in further view of Ouderkirk et al. (U.S. 5,825,543).

As to claims 1, 9 and 10, Larson discloses a polarization sensitive scattering element that acts to effectively separate light of different polarizations. Note the first embodiment shown in figure 1. The polarization scattering element 17 is laminated on the rear polarizer 16 of liquid crystal display panel 10. Figures 3a-3h provide various embodiments of the polarization sensitive scattering element (PSSE). Figure 3a shows a uniaxial homogeneously aligned PDLC structure comprising liquid crystal droplets 22 embedded in a polymer matrix 21. The film is then stretched to elongate the liquid crystal droplets. The refractive indices of the liquid crystal are selected such that either the ordinary or extraordinary index of the liquid crystal matches the corresponding index of the polymer, and such that the other index is highly mismatched. Here, the extraordinary index was substantially mismatched and the ordinary index was

substantially matched. The polymer can be birefringent but the birefringence of the liquid crystal and polymer are different in order to ensure a mismatch in scattering efficiency for the two polarization axes. See column 6, line 30 – column 7, line 10.

Larson does not disclose how closely the ordinary index is matched or the degree of mismatch of the extraordinary index. Ouderkirk et al. discloses an optical film wherein the index of refraction of continuous and disperse phases are substantially matched along a first orthogonal axis and substantially mismatched along a second orthogonal axis. The indices differ by no more than 0.03 along a matched axis and differ by at least 0.07 along a mismatched axis. This type of scheme provides a high degree of control in providing optical bodies of consistent and predictable high quality performance. See column 7, lines 30 – 37. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to match and mismatch the indices of refraction as taught by Ouderkirk because of the high degree of control in providing optical bodies of consistent and predictable high quality performance.

As to claim 2, thermoplastic liquid crystal polymer with the recited chemical structure was well known and obvious for showing liquid crystal characteristics within a predetermined temperature range as evidenced by the disclosure of Hiji et al. (U.S. 5,953,089). See column 4, lines 55-67. It would have been obvious to one of ordinary skill in the art at the time of invention to use this liquid crystal polymer in the optical film of Ouderkirk et al. because it exhibits liquid crystal characteristics within a specific temperature range.

As to claims 3 and 4, the range claimed by applicant for the length of the dispersed liquid crystal polymer particles is very broad and virtually non-limiting. The length of liquid crystal polymer particles formed by all known conventional methods is well within this range. It would have been obvious to one of ordinary skill in the art at the time of invention to form particles with lengths between 0.05 and 500 microns because this encompassed the entire practical range.

As to claims 5-8, Ouderkirk et al. teaches that the disclosed optical body can consist of a multi-layer film as shown in figure 5. Ouderkirk et al. discloses that this type of construction is desirable in that it promotes lower off-angle color. Furthermore, since the layering or inclusion of scatterers averages out light leakage, control over layer thickness is less critical, allowing the film to be more tolerable of variations in processing parameters. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to form a multi-layer structure because of the lower off-angle color and the higher tolerance of variations in processing parameters.

Response to Arguments


2. Applicant's arguments with respect to claims 1-10 have been considered but are not persuasive. In response to applicant's argument that the prior art of record does not teach the particle length as claimed, examiner notes that the upper and lower extremes of this range (0.05 to 500 μm) are entirely outside the realistically usable range for light-

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diffusing layers. It would be an absurdity for a light-diffusing layer to have particles with a length smaller than $0.05\text{ }\mu\text{m}$ because the particles would be too small to scatter light. It would be an absurdity for a light-diffusing layer to have particles with a length larger than $500\text{ }\mu\text{m}$ because these particles would be visible to the naked eye. Therefore, this range, which encompasses several orders of magnitude, is non-limiting as previously stated. See Tables 1-5 of Tsuyoshi (U.S. 5,995,183) for typical light-scattering particle sizes. As to applicant's argument that the prior art of record does not provide motivation for using thermoplastic liquid crystal in a polarizing diffuser, examiner notes that it was obvious to do this because thermoplastic liquid crystal exhibits liquid crystal characteristics within a specific temperature range as previously stated, and therefore, its behavior was very predictable.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Chung whose telephone number is (703) 306-0155. The examiner can normally be reached on Monday-Friday from 8:30 am to 5:00 pm.


ROBERT H. KIM
SUPERVISOR / PATENT EXAMINER
TECHNICAL CENTER 2000

David Chung
GAU 2871
07/27/03